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Financial Literacy and Emergency Saving

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Abstract Using data collected by the National Financial Capability Study, a survey recently commissioned by the Financial Industry Regulatory Authority, this paper investigates the correlations between subjectively and objectively assessed measures of financial knowledge, and the probability of having savings adequate to cover 3 months of typical expenses. Results indicate that households who are more financially knowledgeable or more confident in their financial ability are significantly more likely to report having emergency funds. These findings support the growing literature on the relationship between financial knowledge and economic behaviors and have wide policy implications.

Keywords Financial literacy · Financial knowledge · Emergency savings · Precautionary savings

Introduction

This study adds to the growing literature that highlights how a number of knowledge- and behavior-related factors determine family financial decisions. Using a unique data set collected under the National Financial Capability Study (NFCS), a survey recently commissioned by the Financial Industry Regulatory Authority (FINRA), the present paper examines the correlations between both subjective and objective financial knowledge and the propensity to have emergency savings in the amount of 3 months of a household's typical expenses.

Personal savings on the part of consumers is an essential component in wealth accumulation and influences both micro- and macroeconomic growth (GAO 2001). Despite recent incentive programs [e.g., Individual Development Accounts (IDAs)] or broad national campaigns to increase personal savings in the US (e.g., America Saves), rates have remained relatively stagnant or declined since the 1970s, reaching a point of negative savings (or dissaving) in 2005.[1] Personal saving rates in the US have temporarily increased in periods surrounding the financial crisis of 2007–2009, however, rates remain relatively low, as figures indicate a rate of roughly 3.5 % in the early months of 2012 (down from an average of 4.5 % in 2011; BEA 2012). Issues related to economic recovery have recently drawn a great deal of media attention, with personal saving often noted as one of the central sources of concern (Francis 2012; Jones 2010).

The low saving rate not only presents potential problems in terms of long-term financial insecurity, but also short-term concerns over the ability of households to meet unexpected expenses related to their present needs. As noted by Chase et al. (2011), research related to personal savings tends to emphasize retirement security rather than short-term financial concerns, and studies on emergency savings are relatively rare. Emergency savings, when present, serve as a buffer against unexpected economic

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[1] Low saving rates are a distinct characteristic of the US society relative to other developed economies. Some authors (e.g., Garon 2011) attribute this to the US 20th-century culture of mass consumption and reliance on credit.

shocks, such as unemployment spells, unanticipated medical costs or significant but necessary expenditures on a home or vehicle. Kennickell and Lusardi (2006) examined the target amounts of savings that individuals perceive that they need for emergency situations, and report that such savings account for about 8 % of total household wealth. However, research suggests that many Americans are ill prepared for even a moderate economic shock. Findings from a 2009 survey indicate that roughly half of the sampled Americans were not confident in their ability to come up with $2,000[2] in 1 month (Lusardi et al. 2011). This lack of liquidity, or access to funds in the short-run, is highly concerning considering that many of these expenditures are largely predictable, but the timing may be unknown.

Inability to meet unexpected financial needs has been associated with a host of undesirable outcomes. Specifically, as emergency savings levels decrease, households were increasingly likely to report concerns over paying monthly bills, making minimum payments on credit cards, utilization of payday loans, and difficulties paying their mortgage or rent (Brobeck 2008a). Conversely, the act of saving has been positively associated with improved subjective well-being (Shim et al. 2011).

Findings from the present study indicate that the self-reported confidence in financial abilities, as well as the financial knowledge evaluated by the performance on a simple 5-question quiz, is positively related to the likelihood that a household has accumulated modest emergency savings. The results highlight the importance of providing better financial education to Americans. Better ability to navigate financial decisions combined with more accurate recognition of the risks of economic behaviors could eliminate some of the financial vulnerabilities and increase social well-being. The need for financial education is particularly salient given the current economic climate, in which Americans recovering from the recession are faced with greater personal responsibility in an increasingly complex financial market.

Literature Review

In an extensive review of the literature, Chase et al. (2011) identified over 80 articles that examined savings and alternative sources of liquidity available to households in times of unexpected income shortages or expenditure shocks. A large portion of these articles examined the precautionary saving motive, a theory aiming to explain why household inter-temporal saving and consumption behavior does not always conform to the prediction of life-cycle models. Leland (1968) and Sandmo (1970) were among the first studies to show that uncertain future income may increase wealth accumulation. Since then, the definition of precautionary saving behavior has been relaxed to include accumulation motivated not only by income uncertainty, but also risks of unexpected expenditures such as excessive spending on health care (Kotlikoff 1989; Hubbard et al. 1994, 1995; Nocetti and Smith 2010).

Empirical studies have provided inconclusive estimates of the share of total household savings attributable to precautionary motive, ranging from over half (Carroll and Samwick 1996, 1997; Dardanoni 1991; Kazarosian 1997) to a relatively small fraction of the household financial wealth (Guiso et al. 1992; Kennickell and Lusardi 2006). Further, recent evidence from Caner and Wolff (2004) and Lusardi et al. (2011) highlighted the general lack of emergency assets among many households in the United States and across the world. Findings presented by Lusardi et al. (2011), using data from the 2009 Global Economic Crisis Survey, present a particularly concerning picture of financial security. However, despite the fact that many respondents were uncertain of their ability to come up with $2,000 cash in the case of an emergency, the researchers noted that in a time of crisis, households might draw from a broad network of resources for assistance, including short-term credit, family, friends, and adjustments to levels of labor market involvement. Notably, the study also indicates that financial fragility is more severe among those with low financial education.

In theory, households should accumulate a reserve of wealth to protect themselves against unexpected or uninsurable financial risks (Deaton 1992). This behavior, however, is more likely to characterize households who accurately recognize the probability and severity of potential financial emergencies. Prior research indicated that many households might fail to effectively forecast their emergency needs, as the perception of need among low-income households has been reported at roughly $1,500, despite the fact that reported spending on these needs among the same households is about $2,000 (Brobeck 2008b). Thus, the hypothesis tested in the present study states that more financially savvy individuals are better able to recognize and appraise their needs for emergency savings relative to individuals with low levels of financial knowledge. If failure to save adequate emergency funds is partly a factor of poor planning or forecasting error on the part of households, then an analysis of financial knowledge may provide insights that models of assets and income alone would not.

Numerous studies have noted a strong link between knowledge and behavior (Hilgert et al. 2003; Lusardi and Mitchell 2011; Robb and Woodyard 2011), though recent findings indicated that subjective knowledge might be a more effective predictor of financial behavior than objective knowledge (Robb and Woodyard 2011; Xiao et al. 2011). Using a 28-question Financial IQ measure, Hilgert et al.

[2] All dollar signs denote US currency.

(2003) found that respondents who scored lower on a measure of financial knowledge also reported lower levels of savings. Lusardi and Mitchell (2011) provided evidence that higher levels of financial knowledge were associated with planning for retirement. Robb and Woodyard (2011) highlighted strong correlations between both objective and subjective financial knowledge and overall financial behavior, indicating that engaging in responsible financial behaviors (including possession of an emergency savings account) was positively associated with financial knowledge. Greater financial knowledge has also been associated with the use of financial professionals in making decisions (Robb et al. 2012). Working with a financial advisor has been associated with accumulation of emergency funds, among other positive financial behaviors (Marsden et al. 2011).

A number of other factors potentially influence household saving behavior. For example, households might display loss aversion with respect to their consumption, i.e., the tendency to prefer avoiding losses over acquiring gains. Fisher and Montalto (2011) used the Survey of Consumer Finances to compare saving behavior across households who recently experienced unusually high, low or "normal" income. The presence of loss aversion is revealed by the finding that having income below the household's reference level is negatively correlated with the likelihood of saving, but having income above the reference level has no effect on the likelihood of saving. Interestingly, Fisher (2013) did not find similar evidence of loss aversion affecting saving behavior of consumers in Spain.

Among the remaining key determinants of saving, research has provided evidence of a significant shortage of resources available for emergency spending among low to moderate income households (Brobeck 2008a; Browning and Lusardi 1996; Chase et al. 2011). Lower savings rates have also been noted among minority households, as well as those households with lower levels of educational attainment (Chase et al. 2011). However, prior research suggested that emergency savings adequacy differed within minority populations based on ethnicity. Specifically, research using the Consumer Expenditure Survey indicated that Asian Americans were more likely to have adequate emergency savings when compared to Hispanic and African American populations (Hong and Kao 1997). Moreover, determinants of saving behavior may differ across races and ethnic groups (Fisher 2010; Fisher and Hsu 2012), and gender (Whitaker et al. 2013).

Methodology

Data

The data for empirical analysis were drawn from the NFCS, a survey commissioned by the FINRA Investor Education Foundation in 2009. The NFCS provides detailed multi-dimensional measures of the US population's financial literacy, as well as demographic, behavioral, and attitudinal characteristics. The NFCS consists of three separate but related surveys conducted online: a national, a state-by-state, and a military survey. This analysis used the data from the state-by-state survey, the largest of the three data sets, which contains information collected from approximately 500 respondents per state. The working sample consisted of 25,765 individuals, comprising all respondents who provided answers to the key questions used for the measurement of dependent and independent variables. Because the NFCS survey oversampled certain demographic groups, the descriptive statistics presented later in the analysis were weighted to be representative of the general adult US population.

Dependent Variable

To inquire about the status of an individual's emergency funds, the NFCS asked the following question: "Have you set aside emergency or rainy day funds that would cover your expenses for 3 months, in case of sickness, job loss, economic downturn, or other emergencies?" The available answers were: "Yes," "No," "Don't know," and "Prefer not to say." A binary variable was created with the value set equal to 1 if the respondent answered "Yes" and 0 if the respondent answered "No." Observations where the reported answer was "Don't know" or "Prefer not to say" were not included in the subsequent analysis.[3]

Key Independent Variables

To evaluate financial literacy, the NFCS asked a series of questions intended to measure both objective and subjective financial knowledge. The objective measure of financial knowledge was based on five multiple-choice questions about the fundamental concepts of personal finance. The first quiz question was designed to test the understanding of compounding interest: "*Suppose you had $100 in a savings account and the interest rate was 2 % per year. After 5 years, how much do you think you would have in the account if you left the money to grow?*" (Answers: "*More than $102*," "*Exactly $102*," "*<$102*," "*Don't know*," and "*Prefer not to say*"). The second question evaluated the understanding of inflation: "*Imagine that the interest rate on your savings account was 1 % per year and inflation was 2 % per year. After 1 year, how much would you be able to buy with the money in this*

[3] The NFCS interviewed a total number of 28,146 respondents, out of which 668 (2.37 %) replied "*Don't know*" and 379 (1.35 %) replied "*Prefer not to say*" to the emergency savings questions.

account?" (Answers: "*More than today*," "*Exactly the same*," "*Less than today*," "*Don't know*," and "*Prefer not to say*"). The third question measured the grasp of bond pricing: "*If interest rates rise, what will typically happen to bond prices?*" (Answers: "*They will rise*," "*They will fall*," "*They will stay the same*," "*There is no relationship between bond prices and the interest rates*," "*Don't know*," and "*Prefer not to say*"). The next question evaluated the knowledge of mortgage loans: "*A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less.*" (Answers: "*True*," "*False*," "*Don't know*," and "*Prefer not to say*"). Finally, the last question was related to portfolio diversification: "*Buying a single company's stock usually provides a safer return than a stock mutual fund.*" (Answers: "*True,*" "*False*," "*Don't know*," and "*Prefer not to say*"). Details of the financial knowledge quiz questions are summarized in Appendix Table 4. Binary indicator variables were created to indicate the correct answer for each of the quiz questions. Next, an index variable was created with the value set equal to the sum of correct answers to the financial literacy quiz questions.

The subjective measure of financial knowledge was based on the respondents' answers to the following question: "*On a scale from 1 to 7, where 1 means very low and 7 means very high, how would you assess your overall financial knowledge?*"

Estimation Strategy

The analysis was concerned with evaluating the impact of financial knowledge on the reported status of emergency savings. A series of probit models in a general form

$$S_i = \Phi(\beta K_i + X_i\delta), \quad (1)$$

was estimated using the maximum likelihood estimation technique. In the above equation, S_i is the dependent variable for individual i that takes value 1 if the respondent reported having emergency savings and 0 otherwise, Φ denotes standard normal cumulative distribution function, K is the measure of financial knowledge, X is the vector of control variables, and β and δ are the parameters to be estimated. Control variables included in all models comprised respondents' demographic and socio-economic characteristics such as age, gender, educational attainment, number of dependent children in the household, labor force participation status, race, health insurance ownership, income, recent experiences of unexpected income shocks, and subjectively evaluated risk tolerance. The analysis also controlled for variation related to the geographic location by including a set of binary control variables for the respondents' states of residence. State of residence may significantly impact the status of emergency funds due to differences in local economic climate or respondents' exposure to state-mandated financial literacy programs.

Results

Descriptive Statistics

Descriptive statistics for the full sample, as well as separate statistics for groups of respondents who had/did not have emergency funds intended to cover their expenses for 3 months are provided in Table 1. Only about 38 % of respondents reported that they held adequate emergency funds. The low value of this statistic was consistent with recent studies reported in the previous section.

Respondents, on average, were able to correctly answer just 3 out of 5 questions about basic concepts of personal finance. Approximately 80 % of respondents correctly answered the question about compounding interest, arguably the easiest question in the set. The inflation question was answered correctly by about 67 % of respondents. The third question, about the impact of interest rates on bond prices, was answered correctly by about 29 % of respondents. This low percentage was disappointing, since about 40 % of respondents (statistic not shown) reported that they own investments such as stocks, bonds, mutual funds, or other securities outside of retirement plans. Almost 68 % of respondents answered the question about mortgages correctly. Finally, only about 56 % of respondents were able to correctly evaluate the riskiness of a simple portfolio.

The level of financial knowledge appeared to have a significant effect on the status of emergency savings. Individuals who reported having adequate savings to cover 3 months of typical expenditures scored higher on all quiz questions. Moreover, the differences in percentages of respondents who provided correct answers were significant not only statistically, but also quantitatively.[4] For example, the most difficult question (bond prices) was answered correctly by about 36 % of respondents who reported having emergency savings, and only 24 % of respondents who lacked such a safety-net. On average, respondents with emergency savings were able to provide a correct answer to 0.57 questions more than respondents without adequate savings. Also, only about 13 % of respondents who did not have emergency savings were able to answer all financial

[4] The differences in means/percentages between the group of respondents who reported having emergency savings and the group of respondents who reported not having emergency savings were statistically significant at the 0.05 level for all variables included in the analysis.

Table 1 Descriptive statistics (weighted) by emergency funds status

	Full sample	Has emergency funds	
	(n = 25,765)	=0 (n = 15,731)	=1 (n = 10,034)
Has emergency funds	0.3769	0.0000	1.0000
Financial knowledge (total correct)	3.08	2.87	3.44
Interest correct	0.7964	0.7702	0.8398
Inflation correct	0.6657	0.6227	0.7368
Bond price correct	0.2880	0.2424	0.3633
Mortgage correct	0.7761	0.7429	0.8309
Risk correct	0.5558	0.4887	0.6667
Financial knowledge (all correct)	0.1842	0.1271	0.2739
Financial knowledge (subjective)	4.98	4.70	5.44
1–2	0.0456	0.0657	0.0128
3–5	0.6037	0.6726	0.4906
6–7	0.3507	0.2617	0.4966
Respondent's age			
18–24	0.1278	0.1485	0.0935
25–34	0.1706	0.1893	0.1395
35–44	0.1853	0.2032	0.1557
45–54	0.1985	0.2082	0.1825
55–64	0.1651	0.1460	0.1965
65 or older	0.1529	0.1048	0.2323
Female	0.5104	0.5382	0.4644
Respondent's education			
No high school	0.0317	0.0412	0.0160
High school	0.2838	0.3194	0.2251
Some college	0.4222	0.4429	0.3879
College	0.1633	0.1333	0.2129
Post grad	0.0990	0.0633	0.1582
Married	0.6229	0.5840	0.6872
Number of children	0.7457	0.8429	0.5850
Labor force participation			
Works full-time	0.0827	0.0740	0.0971
Works part-time	0.3709	0.3667	0.3778
Self employed	0.0969	0.1016	0.0892
Homemaker	0.0868	0.0943	0.0742
Student	0.0554	0.0642	0.0407
Disabled	0.0404	0.0548	0.0166
Unemployed	0.0941	0.1161	0.0578
Retired	0.1729	0.1283	0.2467
Minority	0.3080	0.3381	0.2584
Covered by health insurance	0.8010	0.7415	0.8994
Respondent's (household) income			
Income <$15,000	0.1362	0.1784	0.0664
At least $15,0000 and <$25,000	0.1276	0.1606	0.0732
At least $25,000 and <$35,000	0.1287	0.1464	0.0993
At least $35,000 and <$50,000	0.1614	0.1731	0.1420
At least $50,000 and <$75,000	0.1909	0.1741	0.2187
At least $75,000 and <$100,000	0.1113	0.0875	0.1506
At least $100 and <$150,000	0.0921	0.0588	0.1471

Table 1 continued

	Full sample	Has emergency funds	
	(n = 25,765)	=0 (n = 15,731)	=1 (n = 10,034)
$150,000 and greater	0.0519	0.0212	0.1027
Income shock	0.4048	0.4699	0.2972
Risk attitude	4.35	3.98	4.96

All differences in means/percentages between the group of respondents who have emergency funds and the group of respondents who do not have emergency funds are statistically significant at the 0.05 level for all variables

literacy quiz questions correctly. The equivalent percentage for respondents who had sufficient savings to cover their expenses for 3 months amounted to 27 %.

Interestingly, despite the poor performance in the financial literacy quiz, many respondents reported high levels of confidence in their financial knowledge. Over 35 % of respondents subjectively assessed their financial knowledge with one of the top two grades in the 7-point scale, and only about 5 % of respondents placed themselves in one of the two categories associated with the lowest levels of financial knowledgeable. Similarly to the objective measure of financial literacy, respondents who reported having emergency savings evaluated their financial knowledge as better than respondents who reported not having emergency funds.

In terms of other descriptive statistics, respondents with emergency funds were older, more likely to be male, better educated, married, and had fewer children than those without a financial safety-net. Compared to respondents who reported not having emergency funds, those who had emergency savings were also more likely to be employed or retired, white, covered by health insurance, with higher income, and no recent experience of a negative income shock. Interestingly, emergency savers reported slightly higher tolerance of financial risk.

Multivariate Analysis

Marginal effects, obtained from probit models in which the status of emergency savings was regressed on objective (Models I and II) and subjective (Model III) measures of financial knowledge and a set of control variables, are presented in Table 2. Both objective and subjective measures of financial knowledge were significant determinants of the propensity to hold emergency savings. On average, providing an additional correct answer to one of the financial literacy quiz questions was associated with a 2.4 % increase in the probability of having emergency funds sufficient to finance 3 months of typical expenditures. Respondents who were able to correctly solve the entire financial literacy quiz were 7 % more likely to hold emergency savings. Similarly, the correlation between the

Table 2 Marginal effects from probit models

	I	II	III
Financial knowledge (total correct)	0.024***		
Financial knowledge (all correct)		0.070***	
Financial knowledge (subjective)			0.081***
Respondent's age (ref: 18–24)			
25–34	−0.043**	−0.041**	−0.041**
35–44	−0.052***	−0.048***	−0.047***
45–54	−0.023†	−0.018	−0.025†
55–64	0.058***	0.064***	0.051***
65 or older	0.159***	0.164***	0.143***
Female	−0.021**	−0.025***	−0.021**
Respondent's education (ref: high school or less)			
Some college	−0.002	0.005	0.001
College	0.073***	0.081***	0.075***
Post grad	0.079***	0.089***	0.087***
Married	0.006	0.006	0.001
Number of children	−0.046***	−0.047***	−0.047***
Labor force participation (ref: works full-time)			
Self employed	0.096***	0.097***	0.076***
Works part-time	0.081***	0.080***	0.075***
Homemaker	0.087***	0.085***	0.080***
Student	0.057**	0.061***	0.060***
Disabled	−0.091***	−0.093***	−0.095***
Unemployed	0.074***	0.074***	0.072***
Retired	0.121***	0.122***	0.104***
Minority	−0.028***	−0.031***	−0.039***
Covered by health insurance	0.091***	0.092***	0.088***
Respondent's (household) income (ref: income <$15,000)			
At least $15,000 and <$25,000	0.025†	0.028†	0.014
At least $25,000 and <$35,000	0.092***	0.098***	0.080***
At least $35,000 and <$50,000	0.125***	0.132***	0.113***
At least $50,000 and <$75,000	0.201***	0.209***	0.187***
At least $75,000 and <$100,000	0.264***	0.273***	0.254***

Table 2 continued

	I	II	III
At least $100,000 and <$150,000	0.345***	0.353***	0.331***
$150,000 and greater	0.458***	0.463***	0.443***
Income shock	−0.101***	−0.101***	−0.098***
Risk attitude	0.026***	0.026***	0.020***

Dependent variable is 1 if respondent says "*Yes*" to question "*Have you set aside emergency or rainy day funds that would cover your expenses for 3 months, in case of sickness, job loss, economic downturn, or other emergencies?*" and 0 otherwise. All models include binary control variables for states of residence. Marginal effects are calculated at sample means $n = 25{,}765$

Significance levels * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; † $p < 0.1$

probability of having emergency savings and self-evaluated financial knowledge was substantial. All other things constant, evaluating the financial knowledge with one additional point on a 7-point scale was associated with a roughly 8 % increase of the probability of having emergency funds.

Table 3 reports the marginal effects from probit models that examined in detail what dimensions of financial knowledge were the most important determinants of the probability of having emergency savings. As a general pattern, answering correctly a difficult question was associated with a more substantial effect on the probability of having emergency savings. For example, all other things constant, respondents who provided the correct answer to the bond pricing question (Model III) and portfolio composition question (Model V) were 5.8 and 6.6 % more likely to have emergency funds, respectively, than respondents who provided incorrect answers.

In terms of other determinants of emergency savings, estimates reported in Tables 2 and 3 indicated that the status of emergency savings was influenced by respondent's age. Moreover, the probability of having emergency funds was lower for female respondents, racial minorities, disabled, and households who had recently experienced a negative income shock. Also, the probability of having emergency funds was a decreasing function of the number of children. At the same time, the likelihood of having emergency savings was higher for college graduates or respondents with graduate educational attainment than for individuals who had only a high school education. Compared to respondents who worked full-time, individuals who were part-time workers, self-employed, homemakers, students, retired, or unemployed were more likely to have emergency savings. Finally, income, risk tolerance, and health insurance ownership had a positive effect on the likelihood of holding emergency savings.

Discussion and Conclusions

As predicted, both types of financial knowledge are important determinants of whether or not a household reports having emergency savings. Likelihood of having emergency savings increased with the number of correct responses supplied for the objective questions. Further, when questions were analyzed based on relative difficulty, the marginal effects on the probability of having emergency savings were larger for more difficult questions. Moreover, consistent with previous research (Robb and Woodyard 2011; Xiao et al. 2011), subjective knowledge has a strong impact on reported behavior.

Lusardi et al. (2011) highlighted the lack of emergency savings among the United States population, indicating that many Americans were one emergency away from financial ruin. The present findings suggest that financial knowledge is strongly associated with the accumulation of emergency savings, which is a crucial component of household financial stability. Some researchers have questioned the importance of financial education, claiming that the effectiveness of education programs is not well supported (Willis 2008). This line of reasoning asserts that further financial education will not improve personal financial behavior. However, a growing body of literature adopts a view supportive of financial education and documents favorable effects of various programs on savings. For example, several noteworthy studies of financial education reported positive effects of programs on saving account ownership and/or contributions among populations of employees (Bayer et al. 2009), individuals who were previously reported for bank account abuse or mismanagement (Haynes-Bordas et al. 2008), or members of armed forces (Bell et al. 2009).[5]

The present results are supportive of the strong positive correlation between personal financial knowledge and emergency saving behavior. However, it is crucial that education programs actually improve financial knowledge, which is not always clearly assessed. Moreover, studies of financial literacy (e.g., Lusardi and Mitchell 2007a, b; Lusardi 2008) adopt a view that education should be a tool of improving financial behavior rather than a goal in itself. Thus, financial professionals and consumer educators need to assess their efforts in terms of actual behaviors, and future analyses should be directed at clarifying what types of programs lead to the desirable behavioral outcomes.

The analysis highlights the importance of both objective and subjective knowledge, indicating that programs should be geared towards improving both types of knowledge. Confidence is a significant component of subjective

[5] Collins and O'Rourke (2010) provide a comprehensive synthesis of literature that evaluates the effects of financial education programs.

Table 3 Marginal effects from probit models

	I	II	III	IV	V
Interest correct	0.017†				
Inflation correct		0.012			
Bond price correct			0.058***		
Mortgage correct				0.025**	
Portfolio correct					0.066***
Respondent's age (ref: 18–24)					
25–34	−0.041**	−0.042**	−0.041**	−0.041**	−0.042**
35–44	−0.045**	−0.046***	−0.047***	−0.045***	−0.050***
45–54	−0.013	−0.015	−0.017	−0.014	−0.019
55–64	0.071***	0.068***	0.066***	0.070***	0.062***
65 or older	0.172***	0.169***	0.166***	0.172***	0.161***
Female	−0.031***	−0.031***	−0.026***	−0.031***	−0.024***
Respondent's education (ref: high school or less)					
Some college	0.007	0.007	0.006	0.006	0.000
College	0.088***	0.088***	0.084***	0.087***	0.077***
Post grad	0.098***	0.098***	0.093***	0.098***	0.084***
Married	0.006	0.006	0.006	0.006	0.006
Number of children	−0.046***	−0.046***	−0.047***	−0.047***	−0.046***
Labor force participation (ref: works full-time)					
Self employed	0.098***	0.098***	0.097***	0.098***	0.096***
Works part-time	0.080***	0.080***	0.080***	0.080***	0.079***
Homemaker	0.085***	0.085***	0.086***	0.085***	0.087***
Student	0.061***	0.061***	0.060***	0.062***	0.058**
Disabled	−0.093***	−0.094***	−0.092***	−0.093***	−0.092***
Unemployed	0.073***	0.074***	0.074***	0.074***	0.072***
Retired	0.122***	0.122***	0.122***	0.122***	0.120***
Minority	−0.034***	−0.034***	−0.033***	−0.033***	−0.031***
Covered by health insurance	0.093***	0.093***	0.092***	0.093***	0.091***
Respondent's (household) income (ref: income <$15,000)					
At least $15,000 and <$25,000	0.027†	0.027†	0.028†	0.026†	0.026†
At least $25,000 and <$35,000	0.097***	0.097***	0.098***	0.095***	0.095***
At least $35,000 and <$50,000	0.133***	0.133***	0.133***	0.131***	0.129***
At least $50,000 and <$75,000	0.211***	0.212***	0.211***	0.208***	0.205***
At least $75,000 and <$100,000	0.277***	0.277***	0.274***	0.274***	0.269***
At least $100,000 and <$150,000	0.359***	0.359***	0.356***	0.356***	0.350***
$150,000 and greater	0.470***	0.470***	0.466***	0.468***	0.462***
Income shock	−0.100***	−0.100***	−0.102***	−0.101***	−0.100***
Risk attitude	0.027***	0.028***	0.026***	0.027***	0.026***

Dependent variable is 1 if respondent says "*Yes*" to question "*Have you set aside emergency or rainy day funds that would cover your expenses for 3 months, in case of sickness, job loss, economic downturn, or other emergencies?*" and 0 otherwise. All models include binary control variables for states of residence. Marginal effects are calculated at sample means $n = 25{,}765$

Significance levels * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; † $p < 0.1$

knowledge, and confident consumers are more likely to take action. The existing financial education initiatives tend to focus on technical aspects of personal finance and ignore positive psychological reinforcement which could play an important role in promoting positive behaviors. However, more research is needed to fully understand the nature of correlations between confidence and saving, with special attention to measuring the extent to which confidence determines and/or is determined by positive financial behaviors.

Findings from the present analysis inform both private and public policy considerations. Employers who are

concerned about their employees' financial wellness could use the results to legitimize financial education programs for their employees that teach needs recognition for emergency savings. Given the fact that many employers already provide financial counseling aimed at planning for retirement or purchasing life insurance, positive results might be achieved with relatively minor adjustments to existing programs. The results also indicate the importance of non-profit organizations that promote financial literacy. Many of such initiatives focus on children, teens or young adults (e.g., Jump$tart Coalition for Personal Financial Literacy based in Washington, DC) and neglect other demographic groups. Arguably, such organizations could have the most dramatic impact on individual saving rates of adults, and more of such initiatives appear to be needed, especially if they target financially vulnerable populations.

Similar to previous analyses of emergency saving, minority status, lower household income, and lower levels of education are all associated with decreased odds of emergency fund ownership. Interestingly, having more children is negatively associated with emergency assets, indicating an area of significant concern. Given these findings, public policy solutions should be considered to shield the vulnerable households from adverse impacts of financial emergencies. Incentive programs and consumer education are important tools of public policy, and certain policy solutions relying on incentives and education have been proposed in the past. For example, the IDAs, the subsidized saving accounts targeted to the poor that provide matches for savings towards certain goals like home purchases or post-secondary education and require individuals to attend financial education have been shown to produce favorable results in terms of individual behaviors (Schreiner and Sherraden 2007). However, the sustainability of IDAs critically depends on federal and state policies that provide or leverage funds for matching contributions of IDA participants.

The present findings are limited in that they do not provide evidence of a clear causal relationship (that is, the present findings do not provide evidence that improved knowledge is what causes emergency saving behavior). The data are cross-sectional and only identify the current situation of respondents. Further, the analysis is reliant on self-reported measures of emergency saving, and is limited to a dichotomous measure of the dependent variable. It would be interesting to analyze the relationship between the adequacy of personal emergency savings and financial knowledge in a framework that accounts for actual individual household circumstances and needs. Finally, the present analysis does not account for alternative sources of liquidity which might reduce the need for emergency savings. Recent studies (e.g., Babiarz et al. 2012) suggest that even households with low financial assets increase their debt following health adversities. Future research should investigate in more detail how access to alternative sources of liquidity affects emergency saving behavior.

Appendix

See Table 4.

Table 4 Selected variables coding

Variable	Coding
Has emergency funds	=1 if respondent answered "*Yes*" to the question: "*Have you set aside emergency or rainy day funds that would cover your expenses for 3 months, in case of sickness, job loss, economic downturn, or other emergencies?*"; =0 if respondent answered "*No*"
Financial knowledge (total correct)	Sum of correct answers to the financial knowledge quiz questions listed below
Interest correct	=1 if respondent answered correctly to the question: "*Suppose you had $100 in a savings account and the interest rate was 2 % per year. After 5 years, how much do you think you would have in the account if you left the money to grow?*" (Answers: a. "*More than $102*," b. "*Exactly $102*," c. "*<$102*," d. "*Don't know*," e. "*Prefer not to say*"); =0 otherwise
Inflation correct	=1 if respondent answered correctly to the question: "*Imagine that the interest rate on your savings account was 1 % per year, and inflation was 2 % per year. After 1 year, how much would you be able to buy with the money in this account?*" (Answers: a. "*More than today*," b. "*Exactly the same*," c. "*Less than today*," d. "*Don't know*," e. "*Prefer not to say*"); = 0 otherwise
Bond price correct	=1 if respondent answered correctly to the question: "*If interest rates rise, what will typically happen to bond prices?*" (Answers: a. "*They will rise*," b. "*They will fall*," c. "*They will stay the same*," d. "*There is no relationship between bond prices and the interest rates*," e. "*Don't know*," f. "*Prefer not to say*"); =0 otherwise
Mortgage correct	=1 if respondent answered correctly to the question: "*A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less.*" (Answers: a. "*True*," b. "*False*," c. "*Don't know*," d. "*Prefer not to say*"); = 0 otherwise

Table 4 continued

Variable	Coding
Portfolio correct	=1 if respondent answered correctly to the question: "*Buying a single company's stock usually provides a safer return than a stock mutual fund.*" (Answers: a. "*True*," b. "*False*," c. "*Don't know*," d. "*Prefer not to say*"); =0 otherwise
Financial knowledge (subjective)	Response to the question: "*On a scale from 1 to 7, where 1 means very low and 7 means very high, how would you assess your overall financial knowledge?*"
Income shock	=1 if respondent (household) experienced large unexpected drop in income in past 12 months; =0 otherwise
Risk attitude	Response to question: "*When thinking of your financial investments, how willing are you to take risks?*" Responses were measured using a 1–10 scale, with 1 signifying "*Not at All Willing*," and 10 noting "*Very Willing*"

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